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Roberts

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(54) **FORCE MEASUREMENT SYSTEM
CORRECTING FOR INERTIAL
INTERFERENCE**

(56) **References Cited**

U.S. PATENT DOCUMENTS

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
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This patent is subject to a terminal dis-
claimer.

3,657,475 A	4/1972	Peronneau et al.	
4,327,578 A	5/1982	D'Angelo	73/117
4,389,711 A	6/1983	Hotta et al.	
4,745,565 A	5/1988	Garwin et al.	
4,918,262 A	4/1990	Flowers et al.	
5,038,142 A	8/1991	Flower et al.	341/34
5,209,661 A	5/1993	Hildreth et al.	
5,294,757 A	3/1994	Skalski et al.	
5,376,948 A	12/1994	Roberts	345/173
5,521,596 A	5/1996	Selker et al.	341/22
5,541,622 A	7/1996	Engle et al.	345/161
5,563,632 A	10/1996	Roberts	
6,285,358 B1	9/2001	Roberts	345/173

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See application file for complete search history.

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(57) **ABSTRACT**

A method and apparatus is disclosed, particularly, though by no means exclusively, useful in touch-screen computer CRT display systems and the like, and more generally in other force and/or torque measurement systems, as in weighing and the like, in which (1) lineal and/or rotational acceleration of the system is sensed in response to inertial interference effects such as tilt or movement that introduce errors into the force and/or torque measurements, and/or (2) inertial error correction from the force data itself is obtained, such as derivative order corrections; and such data is used to correct the force and/or torque measurements. A novel calibration technique for deriving appropriately descriptive coefficients to the particular system for the correcting data, is also disclosed.

7 Claims, 8 Drawing Sheets

